

**What is claimed is:**

1        1. A multi-queue network apparatus for quality of  
2 service oriented communication, comprising:

3        a host system comprising a system memory and a  
4            peripheral bus, the system memory including a  
5            plurality of queues each of which is configured  
6            to store data packets to be transmitted; and

7        a peripheral module comprising:

8            an arbiter, adapted to interface with the  
9            peripheral bus, maintaining a plurality of  
10           next access pointers targeting each queue  
11           within the system memory, respectively,  
12           determining which queue is to be serviced  
13           next contingent upon a quality of service  
14           policy, and fetching at least one data  
15           packet identified by the chosen queue's next  
16           access pointer;

17           a FIFO buffer, connected to the arbiter, storing  
18           and managing the fetched data packet in a  
19           first-in-first-out manner; and

20           physical layer interface logic, connected to the  
21           FIFO buffer, accepting therefrom each data  
22           packet, if available, and preparing the data  
23           packet for transmission on a physical  
24           medium.

1        2. The multi-queue network apparatus of claim 1  
2 wherein the host system maintains a plurality of lists of  
3 descriptors targeting each queue within the system memory,

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4 respectively, each list of descriptors includes access  
5 information for the data packets stored in an associated  
6 queue, and each descriptor is responsible for identifying  
7 one data packet.

1       3. The multi-queue network apparatus of claim 2  
2 wherein each next access pointer points to the descriptor  
3 subsequent to a previous descriptor within a list of  
4 descriptors for a queue, in which the previous descriptor  
5 identifies the data packet most recently fetched from the  
6 queue.

1       4. A multi-queue network apparatus for quality of  
2 service oriented communication, comprising:

3       a host system comprising a system memory and a  
4           peripheral bus, the system memory including a  
5           plurality of queues each of which is configured  
6           to store data packets to be transmitted; and

7       a peripheral module comprising:

8           an arbiter, adapted to interface with the  
9           peripheral bus, maintaining a plurality of  
10          next access pointers targeting each queue  
11          within the system memory, respectively,  
12          determining which queue is to be serviced  
13          next contingent upon a quality of service  
14          policy; and fetching at least one data  
15          packet identified by the chosen queue's next  
16          access pointer;

17          a data path controller, connected to the arbiter,  
18          accepting therefrom the fetched data packet;  
19          and

20           two FIFO buffers, connected in parallel to the  
21           data path controller, storing and managing  
22           the fetched data packet in a first-in-first-  
23           out manner;  
24           wherein the data path controller allows one of  
25           the FIFO buffers to be filled with the  
26           fetched data packet while the other FIFO  
27           buffer is engaged in outgoing transference.

1           5. The multi-queue network apparatus of claim 4  
2           wherein the host system maintains a plurality of lists of  
3           descriptors targeting each queues within the system memory,  
4           respectively, each list of descriptors includes access  
5           information for the data packets stored in an associated  
6           queue, and each descriptor is responsible for identifying  
7           one data packet.

1           6. The multi-queue network apparatus of claim 5  
2           wherein each next access pointer points to the descriptor  
3           subsequent to a previous descriptor within a list of  
4           descriptors for a queue, in which the previous descriptor  
5           identifies the data packet most recently fetched from the  
6           queue.

1           7. The multi-queue network apparatus of claim 4  
2           wherein the peripheral module further comprises physical  
3           layer interface logic, connected to the two FIFO buffers, to  
4           prepare the data packet for transmission on a physical  
5           medium.

1        8. An apparatus for servicing multiple queues in a  
2 host system using reduced number of FIFO buffers,  
3 comprising:

4        an arbiter for maintaining a plurality of next access  
5            pointers for the multiple queues storing data  
6            packets to be transmitted, determining which  
7            queue is to be serviced next contingent upon a  
8            quality of service policy, and fetching at least  
9            one data packet, which is identified by the  
10           chosen queue's next access pointer, through a  
11           peripheral bus by means of direct memory access;  
12        a FIFO buffer, connected to the arbiter, storing and  
13           managing the fetched data packet in a first-in-  
14           first-out manner; and  
15        physical layer interface logic, connected to the FIFO  
16           buffer, accepting therefrom each data packet, if  
17           available, and preparing the data packet for  
18           transmission on a physical medium.

1        9. The apparatus of claim 8 wherein a plurality of  
2 lists of descriptors targeting each queue is maintained  
3 within a system memory of the host system, respectively,  
4 each list of descriptors includes access information for the  
5 data packets stored in an associated queue, and each  
6 descriptor is responsible for identifying one data packet.

1        10. The apparatus of claim 9 wherein each next access  
2 pointer points to the descriptor subsequent to a previous  
3 descriptor within a list of descriptors for an associated

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- 4 queue, in which the previous descriptor identifies the data
- 5 packet most recently fetched from the queue.